

CLAIMS

1. A method of detecting and quantifying trace levels of molecules containing one or more of a range of reactive species, in gases or gas mixtures consisting of alkanes, ethene, or ethyne, said method including using an alkoxyalkyl cation as the chemical
5 ionisation precursor in a selected ion flow tube mass spectrometer.
2. The method as claimed in claim 1, further including reacting the sample gas to be analysed with the alkoxyalkyl cation in a stream of helium in the flow tube.
- 10 3. The method as claimed in claim 1, wherein the alkoxyalkyl cation is a methoxymethyl cation.
4. A method of detecting and quantifying a gas sample containing trace levels of molecules containing one or more of a range of reactive species, in gases or gas mixtures
15 consisting of alkanes, ethene, or ethyne in a selected ion flow tube mass spectrometer comprising the steps of:
 - producing a supply of alkyoxymethyl cations,
 - mass electing the alkyoxymethyl cations,
 - inducing a flow of the alkyoxymethyl cations into the inlet of a flow tube of the
20 spectrometer in a carrier flow of helium
 - reacting the gas sample with the alkyoxymethyl cations,
 - analysing the reacted gas sample in the mass spectrometer, and
 - calculating the concentration of the trace levels of molecules containing
heteroatoms present in the reacted gas sample.
- 25 5. The method as claimed in claim 4, wherein the alkyoxymethyl cation is a methoxymethyl cation.
6. The method as claimed in claim 5, wherein the range of reactive species includes
30 molecules that contain sulphur, nitrogen, oxygen, phosphorus or silicon heteroatoms,